1084

MISA ISSUES RESOLUTION PROCESS

DRAFT SUMMARY REPORT

JUNE 1990

Ontario
Environment
Environnement
Jim Bradley, Minister/ministre

ISBN 0-7729-7353-9

MISA ISSUES RESOLUTION PROCESS

DRAFT SUMMARY REPORT

Report prepared by:
Water Resources Branch
Ontario Ministry of the Environment

reprinted
SEPTEMBER 1990

Copyright: Queen's Printer for Ontario, 1990
This publication may be reproduced for non-commercial purposes with appropriate attribution.

PREFACE

With the Monitoring Regulations promulgated for all nine industrial sectors, the Ministry is now moving into the critical stage of the MISA program: development of the Effluent Limits Regulations. In so doing, the Ministry has and will continue to follow the principles and approach outlined in the MISA White Paper, including consultation with stakeholders and the general public.

The Joint Technical Committees will be reconvened to deliberate and recommend the Effluent Limits Regulations for each sector. Prior to starting regulation development, however, a standardized set of procedures and criteria must be established for each Joint Technical Committee to follow. In this way, all regulations will be consistent and equitable among all sectors. The Ministry instituted an "Issues Resolution Process" which will ultimately provide these necessary procedures and criteria.

Over the past several months, special working groups called Issue Resolution Committees (IRCs) were formed with representation from the Ministry, Industry, and Municipalities; representatives from Environment Canada and the MISA Advisory Committee also participated. These committees have reviewed the various proposals on how to develop the limits regulations. The general development process outlined in the White Paper remains: what the IRC proposals add are more detailed guidelines. They specify the procedures to follow and the criteria to apply at each step (for example, how to determine which technology is the "best available technology"). As well, they define key concepts such as "economic achievability".

At this stage, the IRCs have completed their deliberations and submitted their final reports. The Ministry subsequently summarized the IRC reports into this document. The Ministry is now providing this document for review in order to facilitate additional input from the wide audience of concerned stakeholders who will ultimately be affected by the MISA Effluent Limits Regulations. Selected environmental interest groups have been asked by the minister to examine the IRC proposals and provide their comments and suggestions. When their submissions have been received, they will be carefully assessed, along with the recommendations of the Issue Resolution Committees, and a final determination will then be made.

At the end of the Issues Resolution Process, the procedures and criteria for regulation development will be standardized. Joint Technical Committees (JTCs) will then apply these procedures and criteria to each sector in drafting the Effluent Limits Regulation requirements. This will ensure that the regulations are consistent and equitable.

This document is comprised of four sections.

The first section presents background information on MISA, including the activities to date.

The second section contains descriptions of the steps in the regulation development process and purpose of each step.

The third section provides the topic or "issue" which the IRC addressed in their proposals. There are sixteen (16) in total -- one from each step in the regulation development process.

The fourth section presents summaries of the full Issue Resolution Committee reports. The summaries briefly discuss the approach taken to address the issue and then list all recommended procedures and criteria. Any unresolved concerns are also noted, and alternative proposals are provided.

The full IRC reports, as submitted to the Ministry, are published in a separate document.

TABLE OF CONTENTS

PREFACE		i
TABLE OF CONTENTS		iii
LIST OF FIGURES		iv
I	BACKGROUND	1
II	THE EFFLUENT LIMITS REGULATION DEVELOPMENT PROCESS	2
III	THE ISSUES RESOLUTION PROCESS	7
	The Process	7
	The Issues	8
IV	SUMMARY OF ISSUE RESOLUTION COMMITTEE REPORTS	12
	Quality Assurance and Quality Control	12
	Monitoring Data Analysis	13
	Selection of Parameters for Limits	16
	Virtual Elimination	18
	Best Available Technology	19
	Economic Achievability	23
	Limit Setting and Form of Limits	27
	Net Loadings	32
	Toxicity	34
	Flow Measurement Accuracy	37
	Compliance	39
	Monitoring For Assessment	43
	Stormwater	46
	By-passes	48
	Reporting to the Public	50

LIST OF FIGURES

FIGURE 1. The Effluent Limits Regulation development process 3

I BACKGROUND

The Ontario Ministry of the Environment initiated the Municipal-Industrial Strategy for Abatement (MISA) Program in 1986. MISA is a regulatory program for reducing water pollution from both industrial and municipal dischargers. Initially, technology-based effluent limits will be imposed on each discharger as a minimum pollution control requirement. In addition, more stringent effluent limits can be superimposed on dischargers on a site-specific basis to protect local sensitive receiving waterbodies. The ultimate goal of MISA is the virtual elimination of persistent toxic contaminants from all discharges into Ontario's waterways.

The process to develop technology-based effluent limits involves two phases. In the first phase, effluent monitoring regulations are legislated which require dischargers to monitor their point source effluents at regular intervals according to specific sampling, analytical, quality control, and quality assurance protocols and procedures.

The second stage of the so-called "technology track" involves the development and implementation of effluent limits regulations for each of the industrial and municipal sectors, using data collected under the monitoring regulations. The effluent limits will be developed on a sector-by-sector basis, and will be based on best available technology which is economically achievable, abbreviated as BAT(EA).

The MISA program will initially involve all major polluters that discharge directly into Ontario's waterways, including:

- Industrial direct dischargers in the following major sectors:
    - Petroleum Refining
    - Organic Chemicals Manufacturing
    - Iron and Steel
    - Mining
    - Pulp and Paper
    - Inorganic Chemicals
    - Metal Casting
    - Electric Power Generation
    - Industrial Minerals
- Municipal Sewage Treatment Works

In addition, approximately 12,000 industries, currently discharging into municipal sewer systems, will also be regulated under MISA through the Sewer Use Control Program.

To date, monitoring regulations for all nine industrial sectors have been promulgated and monitoring activities are in progress. Now, the Ministry is ready to move to the development of Effluent Limits Regulations.

II THE EFFLUENT LIMITS REGULATION DEVELOPMENT PROCESS

Regulations specifying effluent limits will be imposed on each of the nine industrial sectors and the municipal sector. These regulations will initially be developed and recommended by sectoral Joint Technical Committees (JTCs) comprised of representatives from the Ministry, Industry/Municipalities, and Environment Canada. Members of the MISA Advisory Committee will also participate at the JTC meetings as observers.

The general process which will be followed in developing the regulations was provided in the MISA White Paper. Below, each step is briefly described. An overview of the entire process is presented in Figure 1.

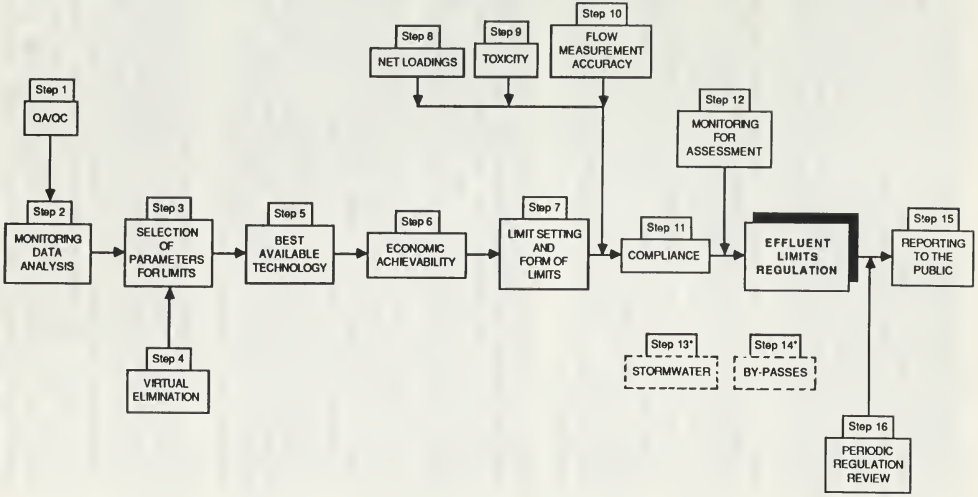
Step 1. The data collected under QA/QC is compared with the monitoring data. This provides a measure of the accuracy and precision -- and hence the reliability -- of the monitoring data. Data which are considered unreliable are eliminated from further consideration in the limit setting process.

Step 2. After eliminating unreliable data, the monitoring data are then analyzed. At this point, results which significantly deviate from the norm are also eliminated from further consideration. This is done to ensure that the results on which limits are based are truly representative of the effluent quality.

Step 3. Under the Monitoring Regulation, dischargers were required to monitor for a comprehensive list of contaminants. Statistical tests are now applied to the monitoring data to identify/confirm which contaminants from that list are absent from the effluents. Those parameters determined to be absent will/need not be considered for the purpose of setting limits at this time.

Step 4. Now that all parameters which may be subject to limits have been identified, the process of determining appropriate limits is begun. The MISA goal for controlling persistent toxic substances is to the level of "virtual elimination". Therefore, as a first step, the key concept of "virtual elimination" must be defined.

Step 5. The next step is to evaluate the pollution control technologies which are available. These will be screened on the basis of the number, kind, and toxicity of contaminants which they treat and the reductions which they can achieve for those contaminants. Generally, a short list of technologies representing different levels of control, and their costs, will be identified through this process. This list of technologies will constitute the potential best available technologies (BATs).



* Note: The process applies to process effluents, once-through cooling water, storm water (Step 13) and by-passes (Step 14).

FIGURE 1. The Effluent Limits Regulation Development Process

Step 6. Information about estimated pollutant removal efficiencies and costs of the various potential BATs, provided in Step 5, will be used to derive abatement cost functions which show the relationship between increasingly stringent levels of control and the cost of achieving them. Financial and economic consequences associated with various levels of control will also be estimated. All of the information on technologies and economic and financial impacts will be used when choosing the "best available technology economically achievable", BAT(EA).

Step 7. Once BAT(EA) has been selected, discharge limits are set. These will be imposed on the contaminants which the BAT(EA) can treat and at levels which the BAT(EA) can achieve.

The limits imposed can be expressed in various ways (for example, on the basis of production rate). At this stage, then, the form of the limit is also determined.

Step 8. The terms under which net loadings would be allowed/disallowed are now identified.

Step 9. Under the regulation, dischargers must not only meet the limits, but must also ensure their effluents meet toxicity requirements. Therefore, toxicity testing requirements are established at this step. The requirements will stipulate when and how dischargers must test their effluents and will identify the repercussions of non-compliance.

Step 10. As mentioned in Step 7, limits may be expressed in different ways. One form is the amount or "load" of contaminants discharged. The load is determined by multiplying the concentration of the contaminants in the effluent times the rate at which the effluent is discharged. The accuracy of this measurement will depend in part on the accuracy of the device which is used to measure the flow. Therefore, a level of accuracy and precision for flow measuring devices is set, and dischargers must ensure their equipment is designed and maintained to achieve it.

Step 11. All control requirements pertaining to discharges have been established at this point. The regulation must now set out the terms and conditions of compliance. These will specify what the Ministry and dischargers must do in order to demonstrate that the regulation requirements are upheld. The frequency of monitoring contaminants for the purpose of assessing compliance with the effluent limits will be stipulated. The consequences of non-compliance will also be spelled out. Information gained through compliance monitoring will provide the Ministry and the public with information on the effectiveness of the MISA program.

Step 12. As well, assessment monitoring requirements will be established. Assessment monitoring will apply to two groups of contaminants that are not subject to effluent limits. The first group are those contaminants which were identified from previous monitoring data but which are not treated by the technology chosen as BAT(EA). The second group will include contaminants which are added to the Ministry's updated Effluent Monitoring Priority Pollutants List. This assessment monitoring will provide the data required to set limits at some future time when technology becomes available.

Step 13. In addition to wastewaters generated as a result of plant processes, stormwater flowing from a plant site may also be contaminated. At this step, the methods for alleviating pollutant loadings in stormwater flows will be determined.

Step 14. Another concern is those instances where an effluent by-passes the treatment plant and is discharged either untreated or only partly treated. Practices and procedures to eliminate such occurrences will be identified.

At this point, all regulation components and requirements will be assembled into a single package, and will be promulgated as the Effluent Limits Regulation for the sector.

Step 15. The Ministry will continue to report to the public after the limits regulation is promulgated. Reports will provide information on which dischargers are in compliance, which dischargers have to implement further pollution abatement, and the status of individual abatement programs. How and when that information will be made available will be determined at this point. Reports will also indicate progress toward achieving the MISA goal and objectives.

Step 16. The regulations will be periodically reviewed and, if new technology exists which could reduce contaminant levels below those imposed by the current limits, then the regulations will be revised to reflect the more stringent limits.

The regulation development process, as described above, provides general guidance. Each step in the process, however, will require the application of scientifically sound and defensible procedures and criteria. In most cases, there are various procedures and criteria available. Hence, further direction to the JTCs will be required.

The Issues Resolution Process, described in the next section, was initiated by the Ministry to provide that direction by establishing standardized procedures and criteria for each regulation development step. These would ensure that key concepts would not be open for interpretation. More importantly, the standardized procedures and criteria would give clear and specific guidelines to the JTCs as they draft regulation requirements. The consistency inherent in the use of standardized procedures and criteria would also assure the development of equitable regulations across all sectors.

III THE ISSUES RESOLUTION PROCESS

The Process

To develop the standard procedures and criteria, the Ministry initially reviewed each step in the Effluent Limits Regulation development process. Using the following four precepts, the Ministry then selected the most appropriate alternative, from those procedures and criteria available, for each step:

- Maintain and reinforce MISA principles
- Are technically defensible
- Have been successfully demonstrated by other jurisdictions
- Uphold international agreements and commitments.

The Ministry consulted with Industry and Municipalities on the selected alternatives through the Issue Resolution Committee (IRC) forum. Other stakeholders, specifically representatives from Environment Canada and the MISA Advisory Committee, also participated at the IRC meetings. Through discussions at these meetings, the Ministry gained additional technical information and comments, as well as the concerns of Industry and Municipalities, about the practical limitations of the Ministry's proposals. The Ministry addressed these concerns to the extent possible, provided that the above four precepts were not compromised. For those areas where there was agreement among the participants, the agreed upon alternatives have been put forward as IRC recommendations. For those areas where agreement was not possible, the concerns and other options suggested by participants were recorded. Therefore, for each issue, both the Committee's recommendations (that is, unanimous agreements) and unresolved concerns (including options) are provided in the IRC reports.

The IRC reports are comprehensive in nature, providing full details on the proposals and associated concerns. These reports have been submitted to the Ministry. Before making any decision on the Issue Resolution Committee recommendations, the Minister requested that other parties, who had expressed an interest in participating in the Issues Resolution Process and who would ultimately be affected by the MISA Effluent Limits Regulations, review and comment on the reports. In order to expedite that review, the Ministry prepared this document, which contains a description of the issues, the process by which the issues were discussed, and summaries of each of the Issue Resolution Committee reports.

Following receipt and assessment of comments from all interested stakeholders, the Ministry will make a final decision on the procedures and criteria to be used in developing all MISA Effluent Limits Regulations. Each sector Joint Technical Committee will then re-convene for the purpose of developing and recommending the regulation requirements for that sector using the Ministry-approved standard procedures and criteria.

The draft effluent limits regulation for each sector, after being reviewed by the MISA Advisory Committee, will be submitted to the Minister. The Minister, in turn, will release the documents to the public for review and critique, thereby reinforcing the MISA principle of involving the general public and interest groups in all facets of the program.

The following section contains brief descriptions of each issue which was discussed within the Issue Resolution Committee forum. Section IV presents brief summaries of the full Issue Resolution Committee reports.

The Issues

Key activities, definitions, and concepts, that will be encountered by the JTCs in each step of the sectoral regulation development process, are grouped under the term "issue". Thus, for each step in the regulation development process there is a corresponding issue. The purpose of the Issue Resolution Committees was to recommend standard procedures and criteria for each of the issues.

Each issue is briefly described below. The regulation development steps corresponding to each issue are also provided.

Quality Assurance and Quality Control *(Step 1)*

A standard process must be developed whereby quality assurance and quality control information can be applied in order to validate data collected under the Effluent Monitoring Regulations. The standard process will allow for comparison of data sets for individual dischargers within a sector. It should also allow for identification of potential under- and over-estimation of monitoring data values, data consistency, trends, discontinuities, and sources of variability, which are the important factors for accepting or rejecting monitoring data.

Monitoring Data Analysis *(Step 2)*

Scientific literature provides a variety of tests which can be used to analyze monitoring data. A single set of tests must be selected and applied in order to ensure consistency in the evaluation of monitoring data among the various sectors. The issue here is to determine which tests are most appropriate to the nature of the data and to the ultimate uses of the analytical results, that is limit setting and reporting to the public.

Selection of Parameters for Limits *(Step 3)*

It is the intent of the Ministry to set limits on as many contaminants as possible. The monitoring data must therefore be evaluated so that those parameters of greatest concern can be targeted for limits at this time. In order to evaluate the monitoring data for this purpose, a standard test must be developed which can be used to establish which parameters have priority for abatement. This test for the Selection of Parameters for Limits would apply to all waste stream types in all sectors.

Virtual Elimination *(Step 4)*

The White Paper of 1986 clearly states the ultimate goal of MISA to be the "virtual elimination" of persistent toxic substances from discharges to Ontario waterways. "Virtual elimination" denotes a stringent level of environmental protection, but needs further definition.

Best Available Technology *(Step 5)*

As stated in the White Paper, the Ministry intends to impose limits which are based upon Best Available Technology. This approach to regulating water pollution has been adopted in the U.S. The terms "best", "available", and "technology" are, however, open to interpretation. For example, "Available" could mean "demonstrated by bench-scale experiments", "for sale in the marketplace", or "used in actual plant applications".

The first task in addressing this issue is, therefore, to define "best", "available", and "technology" in the context of MISA. The Best Available Technology so-defined will be the one upon which effluent limits will be based. The second objective in resolving this issue is to develop a uniform process for the selection of Best Available Technology (BAT) from a list of available technologies that can be applied within a sector or sub-sector. It is envisaged that selection of BAT would be done through the application of standard procedures and criteria which would be applicable to all direct and indirect dischargers in the industrial sectors and the municipal sector.

Economic Achievability *(Step 6)*

Economic and financial analyses have been employed for many years in Ontario and in other jurisdictions for the development and implementation of environmental policies and programs. However, existing Ontario legislation and regulations do not explicitly call for an assessment of "economic achievability". As a result, there is no definition for "economic achievability", nor are there any guidelines for defining this term, in existing Ontario legislation or in existing government policy. Thus, there is a need to define the term "economic achievability" and to establish procedures and criteria by which it can be assessed.

Limit Setting and Form of Limits *(Step 7)*

The Effluent Limits Regulations will specify the maximum levels of contaminants allowed in discharges to the aquatic environment. The Ministry anticipates that, in general, limits will be set on those parameters for which treatment is available under the selected BAT(EA). Procedures and criteria are, thus, needed which will enable each sector Joint Technical Committee to determine and set the "not-to-exceed" levels for each pollutant to be controlled by BAT(EA).

MISA is intended to reduce the total quantity of pollutants entering Ontario waterways. In order to achieve this goal, various forms of limits may be used including concentrations, loadings, and production-based loading limits. A standardized procedure is needed to enable each JTC to recommend effluent limits in the form most appropriate to the source and characteristics of the wastewater in the sector.

Net Loadings *(Step 8)*

The issue of "Net Loadings" centres on the question of whether or not dischargers are responsible for that portion of the pollutants which are present in their intake water and over which they have no control. Resolution of this issue will provide standard criteria to determine if, and under what circumstances, "net loadings" may or may not be considered.

Toxicity *(Step 9)*

The inclusion of toxicity requirements in the Effluent Limits Regulations raises a number of questions, including: what organisms should be tested?; how often should toxicity tests be performed?; and, what consequences result from failing a toxicity test? Answering these and other questions will provide procedures and criteria which all JTCs will use during development of regulation requirements for each sector.

Flow Measurement Accuracy *(Step 10)*

In order to ensure that the flow data reported by dischargers under the Effluent Limits Regulations accurately reflects the true loading of contaminants to the environment, the accuracy and precision of flow measurement must be defined. In addition, in order to maintain that accuracy, methods and frequencies for calibration, re-calibration, and inspection of flow measuring devices are also required.

Compliance *(Step 11)*

Once the Effluent Limits Regulations are in place, the Ministry needs a set of rules which can be used to ensure that dischargers are fulfilling their responsibilities, not only with respect to the effluent limits, but also with respect to other regulatory requirements,

such as reporting and record-keeping. This set of rules will guarantee that dischargers across Ontario receive equal treatment when it comes to enforcing MISA regulations.

Monitoring For Assessment *(Step 12)*

Non-limited parameters must be further categorized and the appropriate level of monitoring for each category must be set. This is done in order to obtain necessary information for future limit setting.

Stormwater and By-passes *(Step 13 and Step 14)*

It is the Ministry's intent that limits will be imposed on all sources of pollutants which are discharged into natural waterways. Two types of sources, stormwater and by-passes, present unique regulatory challenges because they are non-continuous flows. Therefore, procedures and criteria for controlling these sources need to be developed.

Reporting to the Public *(Step 15)*

The MISA White Paper of 1986 states that "the public will have complete access to data on contaminant discharges to surface waters and on the effluent limits set for all discharges. They will know which dischargers are in compliance, which dischargers have to implement further pollution abatement and the status of individual abatement programs".

The issue here is to define a reporting process which will fulfil this commitment. The process must also account for the provisions of the Provincial Freedom of Information and Protection of Privacy Act, as it pertains to dissemination of proprietary information.

Periodic Regulation Review *(Step 16)*

As pollution control technology improves new, more stringent effluent limits can be developed and incorporated into the updated version of the Effluent Limits Regulation. It is the intent of the Ministry that the typical review period for successive regulations should be no longer than five (5) years. Consequently, this is no longer an issue.

IV SUMMARY OF ISSUE RESOLUTION COMMITTEE REPORTS

The following sections present summaries of the Issue Resolution Committee reports. The reports recommend standardized procedures and criteria which JTCs should apply in the development of Effluent Limits Regulations. In this way consistent and equitable regulation requirements will be imposed across all sectors. Deviation from these procedures and criteria, when finalized after the review by environmental interest groups, will not be allowed except in unique situations within a sector where it is impractical to follow these procedures and criteria. This deviation must be fully justified by the JTC.

Quality Assurance and Quality Control *(STEP 1)*

The frequency of occurrence and the levels of analytes reported by regulated industries will impact on the selection of parameters, determination of BAT(EA), and the setting of effluent limits. The quality of these data must be evaluated to ensure defensible decisions. The primary data quality concerns include the possibility that:

- Low results represent false positive findings
- Non-detected results represent false negative findings
- Results are underestimated or overestimated
- Analytes are misidentified

Standardized procedures and criteria are needed in order to address these concerns. These procedures and criteria will guide the JTCs on the use of information arising from MISA field and laboratory quality assurance/quality control (QA/QC) and inter-laboratory comparison (ILC) activities for validation of monitoring data. Use of these procedures and criteria will ensure that a consistent approach is taken in determining which data are sufficiently reliable for the ultimate purpose of limit setting.

RECOMMENDATIONS

- A standardized procedure and set of criteria should be applied to assess data quality. One such procedure and set of criteria are contained in a report, titled "Guidance Document for the Assessment and Interpretation of Analytical and Quality Control Data". The procedure and criteria contained in the report enables examination of data consistency, trends, discontinuities, sources of data variability, and overall data comparability. It also allows identification of the potential for under- or over-estimation of resultant values, and for false positive or false negative decisions for specific analytes.

- Effluent monitoring data should be evaluated by graphical and statistical techniques to identify patterns and anomalies. Effluent data should also be reviewed across a sector to establish overall data variability and consistency.

- The data evaluation process should include interaction of Ministry sector specialists, data managers, laboratory scientists, and quality assurance staff.

- Inter-laboratory comparison data should be examined to evaluate comparability among laboratories. Such data are not to be used to correct reported effluent data.

- Effluent data which is deemed satisfactory, based on the QA/QC evaluation, may be used to establish effluent limits.

- Effluent monitoring data which is deemed to be less satisfactory may still be useful for other program purposes and should be retained.

UNRESOLVED CONCERNS

None.

Monitoring Data Analysis *(STEP 2)*

The purpose in addressing the issue of Monitoring Data Analysis was to determine what statistical tools would be needed and how they would be applied to the MISA effluent monitoring data for the purposes of:

- General data analysis
- Variability analysis and calculation of effluent performance values
- Reporting monitoring and compliance data to the public

In addition, it was necessary to determine and recommend criteria for the use of non-MISA data.

Monitoring of effluents from plants in the nine major industrial sectors is in progress, and the data generated from the MISA monitoring program will be extensive. To interpret the data, and to use the data in a meaningful way for limits derivation and reporting to the public, statistical analysis of the data is required. Generally, the experience of the United States Environmental Protection Agency (U.S. EPA) has been used as the basis for the statistical approaches and methods proposed.

RECOMMENDATIONS

General Data Analysis

- The data should be analyzed on a plant-by-plant basis.

- Procedure for statistical computations:
    - The entire data set should be characterized for normality first, using approved statistical methods

- Then certain pieces of raw data should be considered for deletion based on:
  - Identification of outliers as per outlier tests
  - Questionable data as identified by MISA data entry system (MIDES) tags

- Confirmation of the Distribution of the Data
  - Shapiro-Wilk test for sample size < 50
  - Kolmogorov-Smirnov test for sample size ≥ 50
  - If normality is rejected, then the natural logarithm transformation should be applied and tested for normality of the transformed variable.

- Methods for treatment of outliers *(NOTE: Certain data should be considered for deletion as outliers only during limit setting; this is done to ensure that the limits reflect a homogeneous data set. Data deletion will not be done during compliance assessment)*:
  - Box-plot for preliminary screening
  - Dixon's test for sample size < 25
  - Studentized residual test for sample size ≥ 25.

- Method for treatment of non-detected (<DL) values
  For statistical computations, the < DL data should be handled as follows:
  - For averages, setting of performance values, and compliance, less than detected values should be replaced by RMDL/10 when these are less than RMDL/10, and when these are greater than or equal to RMDL/10, the value as reported should be used *(NOTE: RMDL is the abbreviation for Regulation Method Detection Limit)*.

- Autocorrelation should be tested by the Durbin-Watson test for normal distributions.

- Accounting for Autocorrelation
  - The variance of the mean should be adjusted by a factor involving the autocorrelation estimate and sample size.

- Sub-categorization Analysis
  - Statistical tests for establishing sub-categories are:
    - Bartlett's test for equality of variances
    - One way analysis of variance supplemented by mean comparison test to form homogeneous sub-groups
    - Analysis of covariance when both continuous and discrete independent variables are included in the model.

- In addition, sector specialists can use best professional judgement (BPJ) to establish sub-categories; the factors that should be considered can include differences in production processes, raw materials, and the like.

- Estimation of Averages and Loadings
  - For the calculation of averages of concentrations and flows, the arithmetic mean should be used
  - For the calculation of averages of loadings, the loading value should be calculated as the product of concentration and corresponding flow values. The arithmetic mean of all available loading values should be calculated as the average.

Variability Factor Analysis and Setting of Performance Values

- Variability Analysis
  - The daily and monthly variability factors (VF) should be calculated as:
    - Daily maximum: VF(daily) = 99th percentile* concentration from the distribution of daily samples/mean *(*or the percentile as finally defined under the issue of Limit Setting and Form of Limits)*
    - Monthly: VF(n) = 95th percentile* concentration from the distribution of monthly average samples/mean, where "n" equals the number of sampling days in the month.

- In the calculation of VF(30), autocorrelation among observations should be taken into account by using the adjusted variance given above under Accounting for Autocorrelation.

- Estimation of Long Term Averages (LTA)
  - For plant long term averages for concentrations and loadings, the arithmetic mean of all edited (as per outlier test, treatment of <DL values, etc.) concentration values and loading values, respectively, should be used

- Setting of Performance Values
  - The performance values (PF) should be calculated by multiplying the variability factor (VF) by the long term average (LTA).

Reporting Data to the Public

- Data containing < DL values should be reported as follows:

- For data below RMDL, a range (0 and RMDL) should be used to estimate and report averages of concentrations and loadings. The relative number of values above the RMDL may be provided
- Data equal to or greater than RMDL should be reported as found in the data base
- Wherever applicable, intake data alongside effluent data may be reported.

Use of Non-MISA Data

- Non-MISA data may be used when necessary, provided it meets the criteria outlined in Appendix D of the Issue Resolution Committee Report on Monitoring Data Analysis.

UNRESOLVED CONCERNS

None.

Selection of Parameters for Limits *(STEP 3)*

The main purpose for selection of parameters is to bring forward for each sector or sub-sector a list of parameters to be evaluated for BAT(EA) treatability. Those parameters which are treatable by BAT(EA) for the sector will be regulated under limits.

Data collected under MISA will be used as the basis for selection of parameters for limits. This data base contains current information on toxic contaminants, conventional and non-conventional pollutants in dischargers' effluents.

Limits will be considered for those parameters which are treatable by the technology determined to be BAT(EA) for a particular sector or sub-sector. Procedures and criteria for assessment of treatability have been proposed by the Issue Resolution Committee on Best Available Technology. Parameters which have been selected but for which no treatment is identified under BAT(EA), will be subject to further monitoring.

The objective in resolving this issue was to recommend a procedure for the selection of parameters within a sector or sub-sector from those parameters which were monitored under MISA. The proposed procedure adopts a conservative selection approach, but still allows parameters which are clearly demonstrated to be absent from sector or sub-sector effluents to be omitted from the selection list.

RECOMMENDATIONS

- The selection process to produce a list of parameters for BAT(EA) screening should be applied to those parameters measured under MISA.

- All analytical data collected under MISA should be analyzed by stream type.

- All persistent toxic contaminants should be included, unless the effluent data satisfies the following criterion: a parameter should be deleted from the data set for selection if the monitoring data show (at a 95% confidence level) that a statistical proportion of 0.9 of the data are at concentrations less than the value defined as virtual elimination (since the definition of virtual elimination is unresolved, there are two options for the selection criteria as stated in the under *Unresolved Concerns* below).

- All non-persistent toxic, conventional, and non-conventional pollutants should be included, unless the effluent data satisfies the following criterion: a parameter should be deleted from the data set for selection if the monitoring data show (at a 95% confidence level) that a statistical proportion of 0.9 of the data are at concentrations less than the Provincial Water Quality Objective for that parameter.

- The sector or sub-sector list should consist of the sum of those parameters selected from each plant within the sector or sub-sector.

- Parameters of environmental significance which are not selected according to the above criteria, may also be considered for selection through Best Professional Judgement (BPJ).

- Selected parameters may be deleted through BPJ, provided detailed justification is given.

***UNRESOLVED CONCERNS** (Including Options)*

Selection Criteria for Persistent Toxic Contaminants
(NOTE: Selection criteria for non-persistent toxic, conventional, and non-conventional contaminants are stated above)

Alternative 1: A persistent toxic contaminant should be deleted from the data set for selection if the monitoring data show (at a 95% confidence level) that a statistical proportion of 0.9 of the data are at concentrations less than the Regulation Method Detection Limit (RMDL).

Alternative 2: A persistent toxic contaminant should be deleted from the data set for selection if the monitoring data show (at a 95% confidence level) that a statistical proportion of 0.9 of the data are at concentrations less than the Provincial Water Quality Objective (PWQO).

Additional Proposal

This proposal, put forward by some members of the Issue Resolution Committee, is aimed at directing initial control efforts toward those priority contaminants which have the greatest impact on human health and the environment. This is done only for the purpose of selecting parameters for the first Effluent Limits Regulations, and is not linked to the goal of virtual elimination.

Accordingly, an EMPPL parameter which is persistent and bioaccumulative should be deleted from the data set for selection if the monitoring data show (at a 95% confidence level) that a statistical proportion of 0.9 of the data are at concentrations less than the Regulation Method Detection Limit (RMDL). All other EMPPL parameters should be deleted from the data set for selection if the monitoring data show (at a 95% confidence level) that a statistical proportion of 0.9 of the data are at concentrations less than the Provincial Water Quality Objective (PWQO).

Virtual Elimination *(STEP 4)*

In general, the concept of virtual elimination refers to the degree to which toxic substances are to be removed from the environment. With specific reference to the Ministry's MISA program, the issue relates to point source discharges, and to the statement of MISA's ultimate goal, the virtual elimination of persistent toxic contaminants from industrial and municipal discharges into Ontario's waterways.

RECOMMENDATIONS

- The MISA goal for virtual elimination of persistent toxic contaminants should be achieved stage-wise by the imposition of effluent limits. The first stage is based on BAT(EA).
- Successive Effluent Limits Regulations would set new, more stringent limits based on technological advances.

UNRESOLVED CONCERNS (Including Options)

Definition of Virtual Elimination

Alternative 1: The MISA goal of virtual elimination of a persistent toxic contaminant should be the level below the analytical method detection limit for that contaminant. Thus, as the analytical method improves, the detection limit is expected to become lower.

Alternative 2: The MISA goal of virtual elimination of a persistent toxic contaminant should be the "acceptable level" at or below which there is no further "adverse effect" to the aquatic ecosystem or human health. These factors have been considered in the development of Provincial Water Quality Objectives (PWQOs). Thus, the goal of virtual elimination of a persistent toxic contaminant should be the PWQO for that contaminant.

Alternative 3: Certain members recommended that a new committee be formed to pursue this issue in greater detail through further dialogue with all relevant parties present. The new committee should, therefore, also include representation from environmental interest groups, the International Joint Commission, and academia.

Best Available Technology *(STEP 5)*

The MISA White Paper of 1986 outlined the basic procedure proposed for development of effluent limits.

The basic procedure begins with the establishment of industrial and municipal sectors, and the classification of companies and municipalities into the appropriate sectors. This exercise was completed as part of monitoring regulation development. Based upon the results of the Effluent Monitoring Regulations, additional sectors, or sub-sectors, may be identified.

Data collected under the Effluent Monitoring Regulations, along with information from other sources, will be used to identify those contaminants of concern for each sector or sub-sector for each stream type. The contaminants of concern are those which should be controlled.

Available technologies, capable of controlling the contaminants of concern, will then be identified, and the effectiveness and costs of each technology in treating these contaminants would be established.

After available technologies have been identified and evaluated, the expected levels of control can be determined for each technology.

Using a pre-defined set of objectives, a short list of available technologies will be developed. This short list will be comprised of those technologies which are considered to be the most effective in controlling the contaminants of concern. This short list will constitute the potential BATs.

The purpose in addressing this issue was to define "best", "available", and "technology", and to, thereby, develop a standard procedure and set of criteria for Best Available Technology (BAT) selection. This standard procedure and criteria would be applicable to all types of pollutants and to all industrial and municipal sectors and sub-sectors.

RECOMMENDATIONS

Sector/Sub-Sector Development

- Due to the variety of manufacturing processes, raw materials, and the like, there may be a need to sub-divide the existing sectors into sub-sectors.

- The procedures, criteria, and factors for sub-dividing sectors must be chosen carefully. Where applicable, differences in major factors such as those listed below, should be considered when identifying and establishing sectors and/or sub-sectors:
    - Raw materials
    - Industrial processes
    - Products manufactured
    - Use of process chemicals
    - Effluent treatment technology
    - Source of process effluent.

- Sub-sectors should only be applied when it will lead to more stringent limits.

- Sub-sectors should not be smaller than two Ontario plants.

- In establishing similarity of process effluents, Best Professional Judgement (BPJ) should be used since effluents are never identical, even if they come from similar plants.

Contaminants of Concern

- The contaminants of concern for the sector or sub-sector are to be considered when examining available technologies for consideration as a BAT option for that sector or sub-sector.

- To regulate a contaminant, it should be demonstrated that the BAT option will reduce or remove the substance.

Stream Types

- BAT options should be developed for process effluents, combined effluent streams, once through cooling waters, and stormwater for the plants in the sector or sub-sector; as a first step, the stream types to be regulated at each plant in the sector or sub-sectors should be identified.

Available Technologies

- An available technology may be considered to be:
  - Changes in production processes
  - In-plant controls
  - Effluent treatment technologies
  - Best management practices

  or any combination of the above, found anywhere in Ontario, Canada, the U.S. and/or the developed industrial countries of the world in the sector or sub-sector, or a similar sector or sub-sector that produces untreated process effluents with similar characteristics

  Production processes are considered to be those technologies applied at a plant at any step in the production of its intermediate and/or final products

  An in-plant control is a technique used to improve effluent quality by reducing or eliminating the formation of pollutants and, thus, the need for external effluent treatment

  Effluent treatment processes are considered to be those technologies which are used to eliminate or reduce the total loading of conventional and toxic contaminant substances from process effluent streams

  Best management practices are those specific installed facilities or procedures used to:
  - Manage site runoff and drainage from outdoor process and non-process areas resulting from stormwater or thaw events
  - Control once through cooling water
  - Minimize excursions of the effluent treatment system
  - Manage sludge and waste disposal
  - Minimize the impact of spills.

- A technology can be considered a demonstrated technology if data on the technology is available and that data can be used to predict, with a reasonable degree of confidence, the reliability of the technology and the performance of the technology with respect to contaminant reductions and effluent variability at any plant in the sector or sub-sector, given the expected variability between plants, and could be successfully retrofitted into existing facilities with a reasonable degree of confidence. Demonstrated technologies may be selected from the list of available technologies by the JTC by utilizing the criteria given below.

- The criteria that an available technology should satisfy to be considered as a demonstrated technology are as follows:

- Utilized in the sector or sub-sector
- Utilized in a similar sector or sub-sector that produces effluents with similar characteristics
- Can be retrofitted into existing facilities
- Should preferably be in commercial use for a sufficient time (generally one year)
- Design/sizing and costing information should be available or sufficient information should be available to develop design/sizing and costing criteria
- Bench- or pilot-scale technology can be considered if justification can be provided.

- In order to develop a list of available technologies from which demonstrated technologies may be selected, information on available technologies should be gathered from a number of sources.

- Data gathered from various sources may not all be of the same quality as that required by the MISA Monitoring or Effluent Limits Regulations. To ensure that the effluent limits are based on acceptable data, a mechanism whereby the quality of data can be assured should be applied.

BAT Selection

- The process for selecting BAT options from the list of demonstrated technologies would consider primarily their ability to remove contaminants, and secondarily the following goals for an effluent as determined at the BAT option effluent sampling point:
  - Non-lethal to trout and Daphnia
  - Maximum use of recycling, re-use and reduction, and smallest transfer to other media
  - Maximum water conservation.

- A short list of at least four (4) BAT options should be developed for the purposes of Economic Achievability analysis. It is anticipated that the BAT options will be the demonstrated and combined technologies which best advance the sector or sub-sector towards the realization of the goals, policies and objectives of the MISA activity. It is suggested that the following BAT options should be selected among others:
  - A BAT option that utilizes the best technologies currently in use in North America, Europe, or Japan
  - The BAT option selected by the U.S. EPA for the sector or sub-sector in question
  - A BAT option that utilizes the best technologies currently in use in Ontario in the sector or sub-sector in question
  - A BAT option consisting of any technologies or combinations of technologies which advance the sector or sub-sector towards the goals, policies and objectives stated above.

UNRESOLVED CONCERNS

None.

Economic Achievability *(STEP 6)*

The objective in conducting economic achievability assessments is to ensure that all MISA stakeholders understand the economic and financial consequences of effluent reduction options in order to recommend a Best Available Technology which is Economically Achievable, BAT(EA), for the purpose of setting effluent limits.

The purpose in resolving this issue was to provide the Joint Technical Committees with the principles, procedures, and criteria needed in order to carry out economic achievability assessments of Best Available Technology (BAT) options.

It should be noted that economic achievability (EA) analyses do not provide decision rules for choosing a particular BAT option or for setting limits. Rather, the results of EA analyses provide information on the implications of selecting any BAT option.

Economic Achievability assessments are comprised of three components:

- Cost Estimation
- Determination of Cost-effectiveness
- Analysis of Economic and Financial Consequences

Cost Estimation

To the extent possible, abatement costs for upgrading existing facilities to each BAT option should be estimated for individual plants. The types of information necessary to develop cost estimates for each BAT option include:

- Pollutant removal for each type of pollutant that can be treated by the BAT option
- Capital costs relevant to the type and scale of each abatement technology at the plant capacity. Capital costs should be disaggregated into:
    - Engineering and planning
    - Construction and installation, including retrofitting, equipment and machinery
    - Land acquisition
- Operating and maintenance costs (including monitoring) for a typical year
- Operating life of abatement technologies, in years
- Minimum installation time
- Private benefits of each BAT option, including reduced energy or materials inputs, saleable by-products, reduced labour requirements, enhanced production efficiencies or improvements to product quality
- Wastewater flows and concentrations of pollutants in each stream.

Determination of Cost-effectiveness

For each BAT option, a cost per unit of pollutant removed is to be calculated.

When abatement technologies or BAT options remove more than one pollutant at a time, there is no objective means of apportioning the costs of removal among each pollutant. This means that a unique cost cannot be assigned to the quantity of each pollutant removed. A convention must be established to compute cost-effectiveness ratios for these "joint costs"; the following approaches could be used:

- The total mass of pollutants removed by each BAT option can be summed and used as the numerator in calculating the cost-effectiveness ratio
- Weights are assigned to each pollutant prior to summation. They can be based on priorities assigned to each pollutant as described in the Issue Resolution Committee Report on Best Available Technology.

Another complicating factor in cost-effectiveness analysis is the measure of toxicity. Toxicity is not measured as a mass/unit time removal and so cannot be summed with other parameters. Various approaches can be taken to assess the cost effectiveness of BAT options with respect to toxicity, for example:

- Toxicity units derived from the toxicity tests can be used alone as the pollutant parameter (denominator) in the cost per unit removal ratio
- Use a surrogate parameter that can be measured in mass units in place of toxicity; such a parameter can be weighted and then added to other pollutants, if necessary.

Analysis of Economic and Financial Consequences

Financial indicators and tests to be applied to proposed MISA Limits requirements will be directed at assessing the consequences for plants (if data are available), individual firms, industrial sectors and the provincial economy as a whole. Furthermore, assessments will be implemented to determine if there are disparities of effects between large and small businesses and between regions within the province.

To the extent possible, analyses will explicitly show distribution of various effects on the following segments and groups:

- Owners or shareholders of firms,
- Workers and employees,
- Consumers,
- Suppliers of goods and services for environmental protection.

RECOMMENDATIONS

Cost Estimates

- Cost estimates should be generated on a plant-by-plant basis for each sector.

- Financial and economic assessments should be carried out at an appropriate level (that is, at plant- or firm-level) in each sector, subject to the availability of data.

- Where possible, costs should be estimated for at least four BAT options for each plant.

- Historical data and future costs should be adjusted for inflation, so that comparisons would be based on constant dollars.

- A maximum time horizon of ten years should be assumed for the purposes of the analyses (including the period from which historical financial indicators may be considered), unless a longer period is judged appropriate. This time horizon applies to both historical financial indicators and to future costs and market assessments.

- It is intended that the same analytical procedures would be applied to indirect industrial dischargers which release their wastewaters into municipal sewers. However, there are many more establishments and firms in this category than in the direct discharger grouping. Consequently, analyses of the economic costs and consequences on indirect dischargers may be carried out on representative plants and firms within each industry, and the results of these analyses extrapolated to the remaining firms and aggregated accordingly.

Determination of Cost-Effectiveness

- Abatement cost functions should be developed for different levels of BAT to display the relationships between different levels of contaminant removal and the minimum cost of achieving them.

- Conventions should be established to compute cost-effectiveness when abatement technologies or BAT options remove more than one pollutant at a time.

Analysis of Economic and Financial Consequences

- Analysis of economic achievability can provide a framework for analyzing the impacts of potential BAT costs, but it cannot determine a unique or unequivocally accepted choice from among the BAT options.

- Previous costs of environmental protection and pollution abatement systems at plants subject to MISA requirements should be assembled where possible and considered in the development of abatement cost functions for the sectors; such costs should not be added explicitly to the relevant MISA costs in the proposed economic assessments.

- Costs of present environmental regulatory initiatives and mandated requirements other than proposed MISA regulations should be considered in assessments to the extent possible, recognizing limitations in capital availability.

- Economic assessments of the MISA program should not include non-environmental regulatory costs; the government and public should, however, be aware of, and consider the cost of, additional government policy initiatives.

- Private benefits should be enumerated and valued so as to determine the net costs of each BAT option that is analyzed.

- Annualized costs or discounted present values should be used to permit comparison of capital costs or payments at different times.

- While net costs are to be estimated on a plant or establishment-specific basis, analyses of economic effects should be carried out at the level of the firm, industry, and/or at the individual plant level, as appropriate, and if data are made available. The onus to bring this information forward would be on the firm. In the absence of more disaggregated data, firm-level, publicly available data should be used for the financial assessments.

- Information on market structure of the various industrial sectors should be analyzed to indicate the extent to which firms must absorb the extra net costs as reductions in net profit and returns or will be able to pass all or part of their net incremental compliance costs onto their customers as higher prices or to suppliers by extracting price concessions. The effects on international competitiveness, as measured by sector norms, should also be considered.

- For purposes of the analyses, it should be assumed that no financial assistance will be available from government, other than existing tax policy, such as sales tax exemptions and accelerated capital cost allowances.

- Analyses and tests should be applied, as appropriate, to the selected BAT options, and their associated net costs, for each industry; they may also be applied to alternative BAT options. In any sector, the tests may be expanded.

- The impacts of estimated costs on economic indicators and tests should be assessed for worst, average and best years, during the time horizon analyzed.

- Economic and financial consequences should be assessed for the plant (if data are available), individual firms, industrial sectors, and the provincial economy as a whole; possible disparities of effects between large and small business, and between regions within the province, should also be examined.

- To the extent possible, analyses should explicitly show distribution of various effects on the relevant segments and groups in Ontario.

- While there are no widely agreed upon distinct threshold values, three ranges of outcomes can be provided:
    - Adverse impacts quite unlikely
    - Adverse impacts quite likely
    - Impacts uncertain

UNRESOLVED CONCERNS (Including Options)

Use of Cost-Benefit Analysis

Alternative 1: Public benefits, in the context of formal cost-benefit analysis, should not form part of the basis for JTC decisions during development of Effluent Limits Regulations for each sector.

Alternative 2: The JTCs should consider public benefits when developing the Effluent Limits Regulations.

Limit Setting and Form of Limits *(STEP 7)*

Numerical limits are required as a quantitative means of assessing plant performance with respect to control of effluent quality. Dischargers will be required to meet limits, which will be based on the Best Available Technology Economically Achievable, that is BAT(EA). In setting these limits, a consistent set of rules, to be used by industrial and municipal sectors, will be required to ensure limits are derived on an equitable basis.

The following factors were considered in establishing the limit setting process.

- Type of Limit
- Time basis for Limits
- Parameters to be Limited
- Effluent Streams to be Limited
- Statistical Approach to Limit Setting
- Methods Used for Limit Setting

Type of Limit

Limits can be expressed in various ways. The type of limit chosen will depend on the availability of data and the correlation between variables such as flow, loading, and production.

For the purpose of setting MISA limits, three types of limit will be considered. One type of limit is expressed as a concentration, that is the mass of contaminant per unit of effluent discharged (for example, mg/L). Another type of limit is expressed as a loading, that is the mass of contaminant per unit of time (for

example, kg/d, calculated as the product of concentration and flow). A third type of limit is expressed as a production-based loading limit (for example, mg/unit of production, calculated as loading divided by production rate).

Loading limits and production-based loading limits may encourage the practice of water conservation. When dischargers conserve water in order to comply with the loading limits, concentration levels of contaminants may rise. Under these circumstances, a daily maximum concentration limit may not be set, provided that the original loading limit (prior to water conservation) remains unchanged, or is further reduced, and that the effluent is non-toxic. Under special circumstances, however, the JTC can recommend both loading limits and daily maximum concentration limits.

Time Basis for Limits

Daily and monthly are the normally recommended control periods. The daily period is the shortest period over which routine sampling can be undertaken (for example, 24 hour composite sample). The daily control period takes into account unavoidable short term fluctuations. The monthly control period averages out the daily fluctuations, therefore enabling the setting of a more stringent monthly limit. Longer control period (for example, yearly) should not be considered due to the long time lag between determination of non-compliance and its actual occurrence.

Parameters to be Limited

Limits will be set on those parameters identified by the application of the standard procedures and criteria developed for each step in the regulation development process (refer to Figure 1). These standard procedures and criteria will be used to ensure regulation requirements are equitable and consistent across all sectors.

Application of these procedures and criteria, however, may, in exceptional circumstances, cause a parameter which poses a significant threat to human health and the environment to be eliminated from the list of parameters designated for limit-setting. In these rare situations, the need to protect human health and the environment outweighs the value of consistency. Therefore, in addition to the parameters identified by the standard procedures and criteria, there could be other parameters for which limits will be considered. This additional "safety net" is not designed to circumvent the normal limit-setting process but is necessary in order to ensure that the environment is fully protected.

Effluent Streams to be Limited

In order to control the release of toxic contaminants to surface waters, all effluent stream types should be regulated under limits.

Statistical Approach to Limit Setting

Limits should be set at a level that can be achieved by well-operated plants using technology designated as BAT(EA). It is also expected that these plants have already incorporated the necessary best management practices in their operations. The results achieved by these plants do, however, fluctuate. Sources of fluctuation

include those that are associated with the treatment system, sampling and analytical methods, and/or manufacturing processes. These fluctuations should be accounted for appropriately in the limit setting process through the use of a statistical approach.

In this approach, the daily maximum and the monthly average effluent limits would be calculated as the product of the long term average (LTA) pollutant concentrations and the daily variability and monthly average variability factors (VFs), respectively. The issue at hand is in choosing the proper VF to account for these fluctuations in the limit-setting process. As an example, the monthly average variability factor could be defined as the ratio of the "95th percentile concentration from the distribution of monthly average samples" to the "mean concentration" for a particular pollutant.

Methods Used for Limit Setting

Three methods were considered for calculating the performance level of BAT(EA) plants: linear, average loading, and average concentration.

RECOMMENDATIONS

- Limits should be determined on a sector or sub-sector basis.

Type of Limit

- The type of limit should be:
    - Concentration
    - Loading
    - Production-based loading

  and the type of limit chosen should depend on the availability of data and the correlation between variables such as flow, loading and production.

- Where water conservation is practised, a daily maximum concentration limit may not be set, provided that the original loading limit (prior to water conservation) remains unchanged, or is further reduced, and that the effluent is non-toxic. Under special circumstances, however, the JTC can recommend both loading limits and daily maximum concentration limits.

Time Basis for Limits

- Limited parameters will be divided into:
    - A primary list of parameters having monthly average limits based on measurements taken daily or taken one day per week. Each daily or weekly measurement would also have a daily maximum limit.
    - A secondary list of parameters having a daily maximum limit based on a daily measurement taken once per quarter.

Parameters to be Limited

There was no general consensus on this sub-issue by the Issue Resolution Committee; hence, the various options are presented under *Unresolved Concerns*.

Effluent Streams to be Limited

- Limit setting should be applied to all process, combined, stormwater, and non-contact cooling water effluent streams.

Statistical Approach to Limit Setting

- For each parameter, limits should be based on the product of the long-term average (LTA) and the variability factor (VF) for the BAT(EA) plant.

- Where there is more than one BAT(EA) plant, the LTA and the VF should be based on the average of the LTAs and VFs, respectively, from all BAT(EA) plants.

There was no consensus at the Issue Resolution Committee for choosing the proper VFs; therefore options are presented under *Unresolved Concerns*.

Methods Used for Limit Setting

- The procedure for calculating VF and LTA values should follow one of the following methods:

  Linear Method
  The VF and LTA is calculated from the concentration data of the BAT(EA) plant(s). The product of VF, LTA, and the flow per unit production determined from the BAT(EA) plant(s) will be expressed as mass per unit of production

  Average Loading Method
  The product of VF and LTA is expressed as mass per unit time which is derived from the Long Term Average of loading and the variability factor of loading for the BAT(EA) plant(s)

  Average Concentration Method
  The product of VF and LTA is based on the absolute concentration value which is derived from LTA concentration data and the variability factor of the BAT(EA) plant(s).

UNRESOLVED CONCERNS (Including Options)

Parameters to be Limited

Alternative 1: Limits should be set on parameters for which BAT(EA) treatment exists. Limits may also be set on other parameters which pose a significant threat to human health and the environment.

Alternative 2: Limits should be set on only those parameters for which BAT(EA) treatment exists.

Statistical Approach to Limit Setting

Alternative 1: In order to establish stringent limits, a statistical approach has been proposed. In this approach, the daily maximum and monthly average effluent limits would be calculated as the product of the long-term average (LTA) pollutant concentrations and the daily variability and monthly average variability factors (VFs), respectively. It is recommended that the daily VF be based on the 99th percentile concentration from the distribution of daily samples; and, that the monthly VF be based on the 95th percentile concentration from the distribution of monthly average samples.

As a result of this approach, for each limited parameter, four (4) events of non-compliance with the daily maximum limit in a one year period and one event of non-compliance with the monthly average limit in a 20 month period could occur without any negligent or abnormal operations at plants which have installed and are operating BAT(EA).

Alternative 2: It has been estimated that use of the 99th percentile in determining the variability factor (VF) for daily maximum limits could result in 30-50 violations per year for a large facility that has installed BAT(EA) to comply with the intent of the MISA program; this is because large facilities may have a number of process effluent discharges, each of which may contain a significant number of parameters controlled by daily maximum limits. Therefore, those limits should be based on a reduced probability of non-compliance events.

It is proposed that the daily maximum limits be based on the 99.95th percentile (one non-compliance event per parameter in five years and two days), instead of the 99th percentile. This percentile will result in a limit value higher than that based on the 99th percentile, but will ensure that there is no "statistical"

non-compliance with the limits over the (five year) life of the regulation by a plant which has installed and is operating BAT(EA).

An analogous argument to that stated above could be used in choosing the variability factor for setting the monthly average limit, in order to ensure a similar level of "statistical" non-compliance.

Alternative 3: In Alternative 1, the VF for the daily maximum limit (four non-compliance events per parameter per year) is overly stringent as compared to the VF for the monthly average limit (one non-compliance event per parameter in one year and eight months). In Alternative 2, VF for both the daily maximum and monthly average limits (one non-compliance event per parameter in five years and two days) is relatively lax as compared to the VF for the monthly average limit based on the 95th percentile (one non-compliance event per parameter in one year and eight months).

Some Issue Resolution Committee members felt that the limits should be sufficiently stringent, but at the same time, that the incidence of "statistical" non-compliance should be kept to a reasonable level. These members proposed that an acceptable compromise between the above two competing objectives could be reached using variability factors resulting in one non-compliance event per parameter in one year and eight months. Accordingly, the VF used for calculating the daily maximum limit should be based on the 99.8th percentile, and the VF used for calculating the monthly average limit should be based on the 95th percentile.

Net Loadings *(STEP 8)*

At issue was the determination of the need for the use of net, rather than gross, loading data for the purposes of the Effluent Limits Regulations.

In any examination of plant effluents, the contaminants found may be due in part, or in whole, to their original presence in the intake water. The concept of net loadings recognizes the fact that intake water is not pure and that contaminants may either pass unchanged through the plant or they may have their concentration levels altered by process sources or by treatment.

Theoretically, net loadings can be calculated by subtracting from the mass of a given contaminant discharged in a plant effluent stream over a given time period, the mass of that same contaminant which came directly from the intake water.

There is a potential for the use of net loadings in the following four areas:

- Calculation of BAT(EA) plant performance for the purpose of setting limits
- Determining compliance with the regulatory limits where intake contaminants are the cause of the exceedance
- Reporting of effluent loading data to the public
- Assessing compliance for non-contact cooling water.

RECOMMENDATIONS

- Net loadings should not be used in the development of effluent limits.

  BAT(EA) technology subjects all like contaminants to the same treatment regardless of source. It therefore allows no practical means of separately quantifying the impact of intake contaminants on the final performance data. In addition, the water balance calculated on the net loading basis for each parameter would require an extensive and unduly costly program.

UNRESOLVED CONCERNS (Including Options)

Impact of Intake Contaminants on Compliance

Alternative 1: Since the concept of net loadings would not be used in setting limits, it follows that no net loadings would be allowed in assessing compliance with the effluent limits.

Alternative 2: Where a discharger is in non-compliance due to intake contaminants and demonstrates, to the satisfaction of the Regional Director, that in the absence of the intake contaminants the effluent limits would not have been exceeded, the discharger should be deemed to be in compliance.

Publishing Data

Alternative 1: With respect to reporting of effluent loading data, the public should be provided with a clear picture of what each plant discharges into Ontario's waterways.

To the extent that reporting of typical levels of contaminants in intake water contributes to the better understanding of the environmental impact of a plant's discharge, such intake data should be reported along side effluent data.

Consequently, for the publishing of data in Ministry reports, at the request of the discharger, the Ministry should give consideration to publishing intake water data along side effluent data. The intake water data would be subject to

MISA sampling, analytical, QA/QC and flow measurement requirements.

Alternative 2: In addition to the terms specified in Alternative 1, if a discharger provides net loading data, the Ministry should publish these data as well.

Applicability to Non-Contact Cooling Water

Alternative 1: Net loadings should be used to assess compliance for non-contact cooling water to which no treatment chemicals have been added.

These streams typically have no contact with process streams or chemicals, have relatively short hold-up times at the plant site and are not subject to any form of treatment. Limits for these streams should be based on ensuring that no contaminants are added beyond those present in the intake water.

Non-contact cooling waters to which treatment chemicals have been added should be considered to be process effluents.

Alternative 2: Net loadings should be used to assess compliance for non-contact cooling waters, but may not be allowed if treatment chemicals have been added.

Toxicity *(STEP 9)*

Aquatic toxicity testing is fundamental to MISA. Effluent toxicity testing using standard protocols is a reliable and efficient method of assessing the potential effects of complex wastewaters because it measures the combined effects of effluent constituents on aquatic life.

"Effluents" has been defined to include combined waste streams, process waste streams, once-through cooling waters, and stormwater runoff; however, there are concerns regarding the inclusion of all stormwaters in this category by some Issue Resolution Committee members.

The purpose in addressing this issue was to develop and recommend toxicity requirements for the Effluent Limits Regulations. It should be noted that the proposals presented are intended to become effective after the regulation compliance date, that is, on the same date that dischargers must begin complying with the BAT(EA) limits.

RECOMMENDATIONS

- All direct dischargers should be required to monitor effluents for acute lethality to trout and to Daphnia magna according to Ministry protocols.

- All effluent samples taken for the purpose of toxicity testing shall pass a compliance criteria for acute lethality to trout and to Daphnia magna; the criterion for both tests is 50% survival after exposure to 100% effluent.

- Dischargers shall initially monitor the toxicity of their effluents for a minimum of one year; the Effluent Monitoring Regulation data should satisfy this requirement in most cases.

- For effluents that prove to be non-lethal, based on the one year of monitoring, testing should be continued at a frequency of four (4) times per year.

- Until the one year non-acutely lethal condition is met, the discharger should be required to test samples monthly.

- For effluents which fail either the trout or the Daphnia magna test criteria, the discharger should be required to sample and test weekly for toxicity and to report on the probable causes without delay; monthly monitoring frequency should resume if the samples pass toxicity tests for three (3) consecutive weeks.

- If an effluent fails for either or both organisms on any three of the weekly samples, the discharger should develop and perform a Toxicity Identification/ Reduction Evaluation.

- The Effluent Limits Regulations should be at least as stringent as toxicity requirements of federal regulations and should be compatible with existing international accords and agreements.

UNRESOLVED CONCERNS (Including Options)

Application of Toxicity Limits

Alternative 1: Throughout the discussion, "effluents" referred to process waste streams, combined waste streams, once-through cooling water, and stormwater runoff.

Toxicity limits should be developed for all effluents.

Alternative 2: Throughout the discussion, "effluents" referred to the final discharge of combined effluents, process effluents, and once-through cooling waters.

Effluents which were not monitored for toxicity under the Monitoring Regulation, should initially not be subject to toxicity limits. When enough data are collected, and the appropriateness of applying toxicity limits to that stream is evaluated, toxicity limits may apply.

Consequences of Failing Toxicity Tests

Alternative 1: Enforcement actions, including prosecution, may result if any sample fails either the trout test criteria or the Daphnia magna test criteria at anytime, or if the discharger does not perform a Toxicity Identification/Reduction Evaluation as required.

If an effluent is toxic, even infrequently, there is a potential for irreversible and significant harm to the aquatic environment. The criteria themselves are reasonable since they will permit up to 50% mortalities in full strength effluent. Because the limits are clear cut, they can be easily implemented and administered. The conditions which could result in prosecution are clearly identified. Enforcement discretion will always be necessary to distinguish between a discharger exhibiting due diligence and one who has made little or no effort to attain and maintain compliance. The use of endless cycles of TI/REs is not considered "due diligence", and this mechanism for delaying remediation of toxic effluents should not be tolerated.

Effluents are complex changing mixtures. At one time, a given effluent might kill more trout while at another time, the same effluent might kill more Daphnia magna. The toxicity to both animals should be monitored and controlled independently.

Alternative 2: Enforcement actions may result if an effluent sample fails the trout toxicity test or if the discharger does not perform a Toxicity Evaluation study as required by failure of either the trout or the Daphnia magna test.

A discharger who engaged in the performance of a Toxicity Identification/Reduction Evaluation and who has taken all reasonable steps to control effluent toxicity should be considered to be exercising due diligence and should not be subject to prosecution.

There should be no legal end-of-pipe Daphnia magna toxicity requirement at this time, given the current inadequacy of the understanding of the relationship between toxicity and control technology.

Alternative 3: Municipal direct discharges that fail the toxicity test criteria should not be subject to prosecution if they have an adequate sewer use control program which includes a Toxicity Evaluation. The position that each test failure is an event subject to prosecution will serve as a barrier to cooperation between provincial and municipal agencies. Municipal direct discharges should not have to accept absolute liability every time the test is failed when they have little control over those using their sewage treatment plants. In addition, removal of toxicity due to chlorine and ammonia will be costly and may conflict with human health objectives.

Sub-lethal and Chronic Toxicity Testing

Alternative 1: It is recommended that trout and Daphnia magna sublethal and chronic toxicity monitoring for assessment be performed twice per year on discharges that are consistently non-acutely lethal.

Alternative 2: It is recommended that sublethal or chronic toxicity monitoring should be performed for assessment outside the Effluent Limits Regulation for those effluents which are consistently non-acutely lethal.

Flow Measurement Accuracy *(STEP 10)*

The purpose in addressing the issue of flow measurement accuracy was to define the accuracy of the measuring device, and minimum frequency of accuracy verification for flow monitoring under the Effluent Limits Regulation.

Under the regulation, limits on contaminants in effluent streams may be expressed in terms of total mass loadings of contaminants discharged. Mass loadings are calculated as the product of concentration and flow. Accurate mass loadings are necessary to assess compliance with regulation requirements and to assess the toxic contaminant loadings to the environment. The generation of concentration data under the limits regulation will be subject to strict sampling, analytical, and QA/QC requirements in order to ensure that data gathered are accurate. As flow is a component in calculating mass loadings, flow accuracy specification is needed to ensure that flow data generated will be of comparable quality to the concentration data.

For the most part, revisions to the monitoring regulation flow accuracy requirements for the limits regulation are not required based on the Ministry's experience to date. However, the $\pm$ 20% flow accuracy requirement for combined streams allowed under the monitoring regulation should be made more stringent, since segregation of non-contact cooling water and process effluent streams is expected for this particular stream type.

However, the ± 20% flow accuracy requirement for combined streams allowed under the monitoring regulation should be made more stringent, since segregation of non-contact cooling water and process effluent streams is expected for this particular stream type. In addition to specifying flow measurement accuracy, there is a need to ensure that the accuracy of the flow measuring device is maintained throughout the period of the Effluent Limits Regulation. To this end a comprehensive program of periodic calibration, certification, and inspection is required.

RECOMMENDATIONS

- All process and combined effluent streams should be continuously monitored with an overall flow device accuracy of ± 7% (measured at full scale). The primary flow device shall measure at an accuracy of ± 5% (full scale) while the secondary flow device shall measure at ± 2% (full scale).

- Non-contact cooling water, stormwater (from stormwater control facilities), and any other effluent streams, should be monitored with an overall accuracy of ± 20%.

- Calibration/certification reports would be required for all process and combined effluent flow measuring devices at the beginning of the regulation compliance period and annually thereafter.

- Re-calibration/re-certification would be required in cases where either the primary flow device on a process or combined effluent stream is altered or when flows are outside the calibrated range reported in the last calibration report.

- For non-contact cooling water, stormwater, and any other effluent streams, calibration/certification requirements would be recommended by the JTC.

- Monthly calibration checks would be required for all secondary devices on regulated process and combined effluent streams.

- Quarterly calibration checks would be required for all secondary devices on other effluent stream types.

- In cases where non-compliance with the accuracy requirements of the regulation has occurred for secondary devices on process or combined effluent streams, or where significant drift is shown on the secondary device for effluent streams other than process or combined streams, the Ministry should be notified without delay.

- As a minimum, monthly inspections should be required for all regulated process and combined effluent primary flow devices to ensure proper operation. For other streams, an appropriate inspection frequency should be recommended by the JTC.

UNRESOLVED CONCERNS

Accuracy of Measuring Device

Alternative 1: Best Professional Judgement (BPJ) may be used by the JTC to permit the continued use of existing flow measurement devices on combined effluent streams which do not meet the accuracy of ± 5% on the primary device and ± 2% on the secondary device, given that full technical justification is provided.

Alternative 2: BPJ may be used by the JTC to permit the continued use of existing flow measurement devices or estimation methods on process and combined effluent streams, given that sufficient technical justification is provided.

Compliance *(STEP 11)*

Compliance must be assessed, and dischargers must be held responsible for their actions, through the Ministry's abatement and enforcement policies. These policies are currently being revised into a single compliance policy which includes procedures and tools to bring about compliance.

It is anticipated that compliance with the Effluent Limits Regulations will be achieved by satisfying the following requirements:

- Meeting limits on the concentration or loading of contaminants and on the toxicity of effluents
- Following prescribed sampling and analytical protocols
- Reporting analytical and toxicity data
- Keeping records
- Notifying the regulatory agency of any changes that impact on the dischargers ability to fulfil regulation requirements
- Reporting events, such as by-passes
- Development and implementation of plans, for example, for stormwater control
- Maintaining construction schedules for wastewater treatment facilities

Proposals provided here are intended to make compliance clear, consistent, easily assessed, and uniformly enforceable. As well, the proposals define, where required, the actions and timing for achieving compliance with the Effluent Limits Regulations.

RECOMMENDATIONS

General

- Compliance with the Effluent Limits Regulation means that the discharger meets all the requirements of the regulation.

- Self-monitoring by dischargers would be required to demonstrate compliance with the Effluent Limits Regulation.

- All actions carried out by dischargers to meet regulation requirements would be subject to Ministry audit.

Limits

- Monitoring frequencies for compliance assessment with effluent limits should include the following:
    - A primary list of parameters having monthly average limits based on measurements taken daily or taken one day per week. Each daily or weekly measurement would also have a daily maximum limit.
    - A secondary list of parameters having a daily maximum limit based on a daily measurement taken once per quarter.
    - Daily monitoring is expected for those parameters that are indicative of the performance of the treatment facility. Weekly monitoring is expected for those key toxic substances and non-conventional parameters, and quarterly monitoring is expected for a long list of toxic contaminants.

- The average of four (4) weekly samples or 30 daily samples should be assessed for compliance with the monthly average limits; each daily or weekly measurement should also be assessed for compliance with the daily maximum limit. The daily measurement of once per quarter should be compared against the daily maximum limit.

- Monthly 30-day and 4-day averages should be calculated as the simple arithmetic mean using the replacement rules specified under the issue of Monitoring Data Analysis.

- The types of samples required for compliance assessment should be defined in the Effluent Limits Regulations and should be consistent with those required under the monitoring regulations.

- Plant limits based on a floating re-allocation of like contaminants among streams should not be allowed.

- Prior to BAT(EA) limits coming into force, however, plants should be given the opportunity to re-allocate contaminant loading limits among like streams at the same plant for the same contaminants provided that the overall regulatory loading limits assigned to that plant remain unchanged.

  After BAT(EA) limits come into force, re-allocation may be considered if it can be justified on the basis of overall reduction of contaminant loadings.

Enforcement

- Each violation would be subject to prosecution.

- The Ministry Compliance Policy should be clearly enunciated and applied consistently to all sectors.

Compliance Date

- All plants in a sector or sub-sector would be required to be in compliance with all regulation requirements for that sector or sub-sector after a period of time following the date of regulation promulgation.

- The period of time to come into compliance would be recommended on a sector-by-sector basis by each JTC, with full technical justification. All dischargers within a sector would be subjected to the same period of time. The maximum period of time allowed for a sector would be three (3) years.

- A mechanism to allow an extension beyond the compliance period upon demonstrated unusual circumstances beyond discharger's control, such as unforeseen extensive engineering or construction delays due to factors, such as natural disasters, or for start-up of unproven new technology, should be considered.

Approval of Works

Existing legislation requires dischargers to obtain approval under Section 24 of the Ontario Water Resources Act to establish, alter, extend, or replace sewage works.

- The regulation would specify the time for submission of the application for approval.

- The Ministry would screen and acknowledge applications for approval within a 10 day period; the acknowledgement would identify whether or not the application is complete and, therefore, accepted and, in the case of a complete application, it would identify which approvals process would be used, that is, either "fast track" or "detailed":

Fast Track Approval

A complete application would be processed within 90 days (following the 10 day screening period) from the date the application is acknowledged

Detailed Approval

A detailed review of the application would be required if:

- Water quality-based limits are deemed necessary
- New or expanded facilities are proposed
- Process modifications are proposed which introduce pollutants that are not regulated
- BAT(EA)-limits require construction of works, such as lagoons, where there is a potential for land use conflicts or other environmental risks (for example, groundwater contamination).

- Failure to submit a complete application within a specified time period should be considered to be a violation of the Effluent Limits Regulation.

- Incomplete applications should not be accepted for review.

- Dischargers should not be granted additional time beyond the compliance period because of their failure to submit a complete application for Ministry approval.

Interim Requirements

- There should be interim requirements in place to control dischargers during the period between the date of regulation promulgation and the effective date of regulation compliance.

UNRESOLVED CONCERNS (Including Options)

Interim Requirements

Alternative 1: All plants should be required to meet Interim Requirements during the period between regulation promulgation and the date at which BAT(EA) limits come into force. Dischargers should be in compliance with Interim Requirements 60 days after promulgation of the regulation.

The Interim Requirements would include interim pipe-specific effluent limits and interim toxicity compliance criteria, and would be developed from the monitoring regulation data. The Interim Requirements should be included in the Effluent Limits Regulation.

Interim Requirements would be based on the principle of no backsliding. For well operated BAT(EA) plants, the Interim Requirements would be the same as the BAT(EA) Limits. These interim limits would not be more stringent than the limits or the toxicity compliance criteria contained in the Effluent Limits Regulation, unless a plant has already achieved a more stringent level of control to protect a local sensitive receiver, as prescribed in the existing Certificate of Approval.

In recommending the Interim Requirements, Joint Technical Committees (JTCs) may give due consideration to changes in a plant's operation (process or production) which occurred after the collection of the monitoring regulation data and where the changes are deemed to have significantly modified a plant's performance in terms of effluent control.

Alternative 2: In order to allow dischargers to install BAT(EA), and/or to improve the performance of existing BAT(EA), interim limits should not be imposed for the period between the date of regulation promulgation and the compliance date. During this period, dischargers' efforts would be directed toward installation of BAT(EA). Accordingly, there would not be a need to impose limits which could lead to possible prosecution, since treatment technology would not yet be in place. Instead, implementation of a self-monitoring control plan to be effective within six (6) months of promulgation is proposed. Quarterly reports would be used to demonstrate performance which could be verified by Ministry audit at any time. Repeated violations would be subject to requirements and conditions as directed under currently available abatement programs.

Monitoring For Assessment *(STEP 12)*

Monitoring under the limits regulation can be classified according to the intended end-use of the data. Monitoring of parameters for which effluent limits have been set (limited parameters) will be conducted to evaluate compliance with the regulatory limits. Parameters for which effluent limits are not specified (non-limited parameters) should be monitored to assess discharge loading and concentration levels and presence/absence status.

Proposals for this issue are intended to set criteria for assessment monitoring of non-limited parameters under the Limits Regulation.

Non-limited parameters are those parameters on the Effluent Monitoring Priority Pollutant List (EMPPL) for which no limits have been set because the parameters were not detected in the effluent during the one year monitoring period or because there is no current demonstrated BAT(EA) to control them. Non-limited parameters should be monitored in order to:

- Ensure that there have been no significant changes to the database on which the original decision to exclude the parameters from limits was based
- Establish on-going loading levels which will be used to determine if additional remedial measures are required
- Provide presence/absence data for parameters for which no previous monitoring had been done because the parameters were new additions to the EMPPL or because standard analytical methods have recently been developed
- Generate data on the performance of new technology which may be designated as BAT(EA) in the future.

The frequency of monitoring of non-limited parameters for assessment should reflect the information needs for which the data are required. It should also be less onerous than the compliance monitoring frequency.

The list of parameters to be monitored for assessment may be based on the full EMPPL or on a sector-specific EMPPL which eliminates classes of compounds not used or generated by dischargers within the sector or sub-sector. New substances would be reviewed by the Ministry for possible addition to the EMPPL.

In cases where the performance of new technology needs to be demonstrated for future limit setting, more intensive monitoring programs may need to be developed jointly with the sector or sub-sector dischargers.

RECOMMENDATIONS

- Quarterly monitoring should be required for all non-BAT(EA) parameters for each process/combined effluent stream in a sector or sub-sector.
- Where non-BAT(EA) parameters are unique to a particular site in a sector/sub-sector, at the recommendation of the Sector Joint Technical Committee, quarterly monitoring for those particular non-BAT(EA) parameters may only be required on a site-specific basis.
- Open scan analyses should be required as part of any EMPPL characterization.
- Semi-annual monitoring should required for all new EMPPL compounds for each process and combined effluent streams.

- Full EMPPL characterization should be required each time there is a significant change to the process that is expected to adversely impact the quality of the process effluent.

- A discharger may be required to conduct more intensive monitoring for the purposes of demonstrating performance of new technology with BAT(EA) potential.

- The Ministry may conduct its own studies of discharger treatment systems for technology development where it is deemed necessary.

- Annual assessment monitoring would be required for non-contact cooling water effluent streams; monitoring parameters would be selected based upon BPJ. Intake water would be analyzed at the same frequency and for the same parameters as the non-contact cooling water effluent stream.

UNRESOLVED CONCERNS (Including Options)

EMPPL Characterizations

Alternative 1: Semi-annual characterization should be required for the full EMPPL (including open scans) for each process and combined effluent stream.

Full EMPPL characterizations are required on a semi-annual basis to ensure that there are no significant changes to the data base obtained under the one year regulatory monitoring period on which the limit setting process was based.

Where the semi-annual characterization frequency for the full EMPPL does not seem justified for simple or very small plants, on the recommendation of the Sector JTC, the Ministry can consider relaxation of the requirements.

Relaxation of these monitoring requirements may take the form of both a frequency reduction to once per year and a shortened EMPPL based on Best Professional Judgement (BPJ) exclusion of parameters which are not associated with the process operations of the sector or sub-sector.

Alternative 2: Sub-sectors should be developed by the JTC for the purposes of Monitoring for Assessment. The sub-sectors, which may be different than those developed for the purposes of BAT selection, would be largely homogeneous with respect to process and chemicals used and would be developed using BPJ.

A sub-sector EMPPL should be developed. The sub-sector EMPPL would be comprised of compounds which are potentially present, or have been detected based on previous data collected, in the sub-sector effluents.

The sub-sector EMPPL should be monitored for the purposes of assessment on an annual basis. The sub-sector EMPPL would be expanded to a full EMPPL every two years.

Stormwater *(STEP 13)*

Proposals under this issue are intended to define the procedures for assessing stormwater monitoring data and to regulate these streams under the Effluent Limits Regulation.

The Effluent Monitoring Regulations require collection of data on stormwater quality and quantity. These data will be used to determine if effluent limits can be developed for stormwater immediately on a sector basis, or whether further studies are required before limits can be developed.

For the purposes of examining the impact of stormwater discharges, a plant site may be divided into outdoor process areas and outdoor non-process areas.

The outdoor process areas may be further sub-divided into:

- Outdoor process activity areas which include outdoor production facilities
- Material handling areas and storage areas which include raw material and product storage areas, tank farms and waste disposal sites. Roof drainage from buildings housing production or process facilities are included in this outdoor process area category.

The outdoor non-process areas of a plant may be divided into two areas, specifically:

- Developed outdoor non-process areas
- Undeveloped outdoor non-process areas.

RECOMMENDATIONS

Limit Setting

- Outdoor process areas and developed outdoor non-process areas of a sector or sub-sector should be regulated by effluent limits for pollutant parameters, provided there is a BAT(EA) for the treatment of stormwater or surface

runoff streams; these effluent limits may be based on concentrations or loadings depending on sector- or sub-sector-specific conditions.

- The stormwater effluent limits development process would follow the same procedures used for development of limits for process effluent streams.

- If limits cannot be developed, the stormwater data collected by the Effluent Monitoring Regulations would be used to determine future actions at the plant site.

Stormwater Control Studies

- If stormwater limits cannot be established for the sector, dischargers may be required to conduct a Stormwater Control Study and implement the study results, if the stormwater, or surface runoff, from outdoor process areas and from developed outdoor non-process areas at the site exceeds the BAT(EA) limits for process effluents for that sector.

- Stormwater Control Studies would be imposed on a site-specific basis.

- Stormwater or surface runoff from undeveloped outdoor non-process areas would not be regulated and would not require a Stormwater Control Study.

- Dischargers would have six months to develop a Stormwater Control Study plan and twenty-four months to carry out the study.

- Implementation of the Remedial Measures derived from the Study should not be part of the regulation; however, the implementation of these measures may be carried out by three options:
    - Issuing a Control Order
    - Amending the Effluent Limits Regulation
    - Delaying implementation until the next scheduled regulation update (five years).

Stormwater Monitoring

- If stormwater limits cannot be established for the sector, and if the quality of the stormwater at a site does not exceed the BAT(EA) limits for process effluents within that sector but does exceed the concentrations considered to be at the level of "virtual elimination", then the discharger may be required to continue monitoring stormwater for the purpose of assessment. The frequency of this monitoring would be determined on a site-by-site basis.

- In addition, monitoring for assessment requirements may be developed on a sector-wide basis to assist in the development of future stormwater limits; these requirements would be included in the Effluent Limits Regulation for the sector.

UNRESOLVED CONCERNS (Including Options)

Alternative 1: In assessing stormwater, the JTC should consider the quality of off-site stormwater entering the plant site, naturally occurring stormwater contamination, and environmental effects.

Alternative 2: In assessing stormwater, the concept of net loadings is generally not allowed, except under the provisions listed in the issue of Net Loadings.

By-passes *(STEP 14)*

By-passes at industrial and municipal plants may be one of three types:

- By-passes which are stormwater or surface runoff or infiltration driven events at industrial sites
- By-passes which are stormwater or surface runoff or infiltration driven events in municipal collection and treatment systems (including so-called combined sewer overflows, or CSOs)
- By-passes which are non-stormwater or non-surface runoff or non-infiltration driven events.

The purpose in addressing this issue was to determine if by-passes should be allowed to occur, and if so, to define the specific circumstances under which they would be allowed within the context of the Effluent Limits Regulations.

RECOMMENDATIONS

By-pass Control

- By-passes should be prohibited, unless:
  - The by-pass was unavoidable to prevent loss of life, personal injury or severe property damage, and was not caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operations
  - No feasible cost-effective alternatives to the by-pass exist, such as the use of auxiliary treatment facilities, retention of untreated or partially treated wastes, maintenance during normal periods of equipment downtime or adequate back-up equipment

- The stormwater, surface runoff, or infiltration event which caused the by-pass exceeded specified design capacity criteria set out in the Effluent Limits Regulation
- The stormwater, surface runoff, infiltration, untreated, or partially treated effluent did not exceed the effluent limitations for that stream and the by-pass was for essential maintenance to assure continued operation.

- Capacity criteria should be developed for controlling by-passes in a sector or sub-sector; this may be accomplished by utilizing sector specific standard codes of practice, design criteria, and/or regulatory practices from other jurisdictions.

- These capacity criteria and the time the discharger will have to develop and implement any by-pass control requirements should be included in the Effluent Limits Regulation.

Combined Sewer Overflow Control

- Combined Sewer Overflows (CSOs) should be abated on a site-specific basis.

- The approach to CSO abatement should involve:
  - Identifying and quantifying the amount of CSO to be controlled
  - Undertaking a CSO Control Study to evaluate various remedial measures and techniques
  - Developing an implementation plan that is economically achievable for the municipal direct discharger.

- Municipal direct dischargers would have thirty-six months to develop and carry out a CSO Control Study

- Implementation of the Remedial Measures derived from the CSO Control Study should not be part of the Regulation; however, implementation may be carried out by one of three options:
  - Issuing a Control Order
  - Amending the Effluent Limits Regulation
  - Delaying implementation until the next scheduled regulation update (five years).

UNRESOLVED CONCERNS (Including Options)

Alternative 1: By-passes should be prohibited, except under those conditions as recommended above.

Alternative 2: The JTC may develop criteria to allow by-passes, other than those listed above, where by-passes are an integral part of the optimization of the effluent treatment plant performance. In addition, the JTC may develop other specified criteria that would allow by-passes provided they can be justified.

Reporting to the Public *(STEP 15)*

In the White Paper of 1986, the Ministry of the Environment stated that "the public will have complete access to data on contaminant discharges to surface waters and on the effluent limits set for all dischargers. They will know which dischargers are in compliance, which dischargers have to implement further pollution abatement and the status of individual abatement programs".

The recommendations presented below identify how that commitment should be met. They address procedures for responding to public requests for data and for dealing with proprietary information, as well as the types of reports which should be released to the public.

RECOMMENDATIONS

Public Reports

- It is recommended that four types of reports be provided to the public:
    - Press Releases, covering letters, and the like.
        - Prepared and issued by the Ministry
        - The Ministry would send copies upon release to any directly affected parties
        - This recommendation is consistent throughout the government of Ontario
    - Regulation Development Reports
        - Including Monitoring and Limits Regulations development documents
        - To be developed in conjunction with each sector JTC
    - Standard Ministry-issued Reports
        - Standard reports developed and issued by the Ministry for reporting status of regulation implementation activities
    - Ad hoc requests
        - Should be satisfied by supplying standard reports, if possible, and if not, should provide data for specific public requests.

- MISA reports should include data provided under the Monitoring and Limits regulations They should also provide the status of compliance of MISA dischargers against these regulations as well as programs to attain compliance. Specifically, the reports should include:
    - Information Received under the Monitoring Regulations
        - Six-Month Monitoring Regulation Summary Report *(Petroleum and Organic Chemical Regulations only)*
        - Monitoring Regulation Summary Report
        - Report on the Industrial Direct Dischargers in Ontario
        - MISA Aggregate Twelve-Month Monitoring Summary Report
    - Supporting Document for Limits Regulation
        - Effluent Limits Regulation Development Document for each sector
    - Information Received under the Limits Regulations
        - Semi-annual Compliance Summary
        - Annual Direct Discharger Monitoring and Compliance Summary.

UNRESOLVED CONCERNS (Including Options)

Release of "Confidential" Information

Alternative 1: Effluent data, as defined under Alternative 1 in the Final Report of the Issue Resolution Committee on Reporting to the Public, should not be considered confidential information and should be released to the public. This definition of "effluent data" would be delineated in the Effluent Limits Regulation. It is recognized that the confidentiality of some other information submitted in order to fulfil the requirements of the Effluent Limits Regulations may, however, be unclear. When such is the case, and release of the information is requested, the request will be referred to the Commissioner of the Provincial Freedom of Information and Protection of Privacy Act for decision.

Alternative 2: The Provincial Freedom of Information and Protection of Privacy Act should apply to all data, including effluent data, supplied under MISA, until such time as it is clear that the Effluent Limits Regulations would be unduly constrained without a change to this policy.

Levels of Compliance

Alternative 1: It is not a requirement of the MISA program that the various types of non-compliance (for example, technical violations, effluent limits exceedance, failure to conduct a Toxicity Identification Evaluation, and the like), be differentiated when reporting non-compliance.

Alternative 2: Reports should differentiate between non-compliance with consequential components that relate directly to environmental effects and other non-compliance (for example, technical or procedural deviations).

Contributions by Source

Alternative 1: The proposed "MISA Aggregate Twelve-Month Monitoring Summary Report" and the proposed "Annual Direct Discharger Monitoring and Compliance Summary" should relate the contribution of Ontario's direct dischargers to other sources including municipal CSOs, foreign direct dischargers, airborne sources, agricultural runoff, and the like, especially for significant waterways, such as the Great Lakes.

Alternative 2: At some future point, it may be of interest to relate the contribution of MISA direct dischargers to other sources. At this point in time, however, such a comparative study should not be undertaken due to the intensive resources required and incomplete data base.